Miniature Mass Spectrometer for Earth Science Research, Phase I

Completed Technology Project (2009 - 2009)

Project Introduction

By drastically reducing the physical footprint of a mass spectrometer to the size of a beverage can, Ceramitron could set a new performance/price standard in the miniaturized MS market. To do this, we propose eliminating the turbomolecular and roughing pumps in favor two chemical sorption pumps (a non-evaporable getter (NEG) and an ion pump), both integrated into the spectrometer's self-contained vacuum enclosure. Ceramitron's patented double-focusing 90

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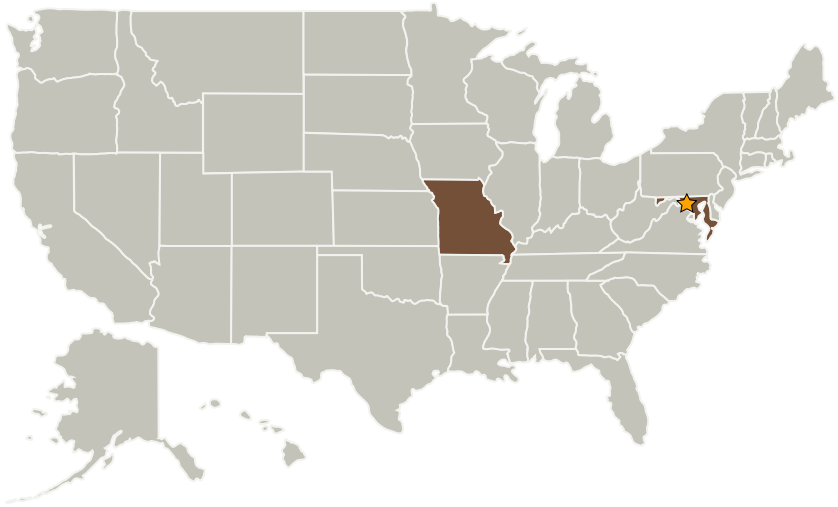
magnetic-sector unit comprises three printed circuit boards, sandwiched together to form a vacuum-tight enclosure containing a dual-filament EI source, ion slits, a photo- lithographically-deposited energy analyzer, lenses and I/O pins, continuous-dynode electron multiplier and the sorption pumps. Target parameters: 200 daltons mass range, 200 resolving power, 5x10-5 Amps/Torr sensitivity, <2kg total weight, <10 watts power consumption. Sample pressure through a pulsed-gas inlet, with flow restrictor, is ~1E-5 Torr. Internal pumps maintain ~1E-6 Torr with no in-flow. Units will be optimized for harsh operating environments.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Ceramitron, LLC	Supporting Organization	Industry	St Louis, Missouri

Primary U.S. Work Locations	
Maryland	Missouri

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.2 Mobility
    - TX04.2.2 Above-Surface Mobility